

providing an analog to digital converter having an AC component less than or equal to one-half the full range of signals which the analog to digital converter itself can accommodate;

connecting the input signal to the input of a programmed gain preamplifier;
utilizing said programmed gain preamplifier to match the full range of said analog to digital converter to said AC component of the input signal; and then,
enhancing the analog to digital conversion range of said analog to digital converter by an offset value thereby causing said programmed gain preamplifier to amplify the input signal at high gain while applying the offset value at low gain.

4. (Twice Amended) In combination:

a reduced span analog to digital converter;
a programmed gain preamplifier coupled between an input terminal for receiving an input signal and said reduced span analog to digital converter;

said programmed gain preamplifier having a high differential gain for said input signal and a low single-ended gain for the offset signal;

said programmed gain preamplifier matching the range of signals which said analog to digital converter can fully accommodate against only a portion of the signal present at the circuit's input; and,

the entire range of signals provided by positioning the analog to digital converter's input signal range by means of an offset value.

5. (Twice Amended) In combination:

- an analog to digital converter having an input terminal and an output terminal;
- a programmed gain preamplifier having an input terminal for receiving an input signal, an offset terminal, and an output terminal;
- a digital summing junction;
- said output terminal of said analog to digital converter coupled to said digital summing junction;
- an anti-alias filter having an input terminal and an output terminal;
- said output terminal of said anti-alias filter coupled to said input of said analog to digital converter;
- said input terminal of said anti-alias filter coupled to said output terminal of said programmed gain preamplifier; and,
- said digital to analog converter coupled between said digital summing junction and said offset terminal of said programmed gain preamplifier for providing an analog offset signal to said programmed gain preamplifier.

6. (Twice Amended) The combination:

- an analog to digital converter having an input terminal and an output terminal;
- a programmed gain preamplifier having an input terminal for receiving an input signal, an offset terminal, and an output terminal;

a digital summing junction;

said output terminal of said analog to digital converter coupled to said digital summing junction;

an anti-alias filter having an input terminal and an output terminal;

said output terminal of said anti-alias filter coupled to said input of said analog to digital converter;

said input terminal of said anti-alias filter coupled to said output terminal of said programmed gain preamplifier;

said digital to analog converter coupled between said digital summing junction and said offset terminal of said programmed gain preamplifier for providing an analog offset signal to said programmed gain preamplifier; and,

wherein said programmed gain preamplifier provides a high differential gain for said input signal and a low single-ended gain for said analog offset signal;

7. (Amended) In the method of operating an analog to digital converter for resolution enhancement, the steps of:

displacing the input signal range of the analog to digital converter to one of a plurality of overlapping positions comprising offset bands wherein the width of each band is representative of the input signal range of the analog to digital converter; and,

overlapping the offset positions to provide hysteresis.